

AU/AWC/RWP214/97-04

AIR WAR COLLEGE

AIR UNIVERSITY

## F-15C EAGLE, ALBATROSS OR BIRD OF PREY?

by

Gary C. West, Lt Col, USAF

A Research Report Submitted to the Faculty

In Partial Fulfillment of the Curriculum Requirements

Advisor: Colonel John Gorman

Maxwell Air Force Base, Alabama

April 1997

REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.					
1. REPORT DATE (DD-MM-YYYY) 01-04-1997		2. REPORT TYPE Thesis		3. DATES COVERED (FROM - TO) xx-xx-1997 to xx-xx-1997	
4. TITLE AND SUBTITLE F-15C Eagle, Albatross or Bird of Prey? Unclassified				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) West, Gary C. ;				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME AND ADDRESS Air War College Maxwell AFB, AL36112				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME AND ADDRESS ,				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT A PUBLIC RELEASE ,					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT In an era of declining budgets, reduced force structure, and lessened air threat, our smaller force must be more flexible and bring more to the fight. A careful look of all our single-mission platforms must be made if we are to expect to retain the capability to decisively win our nation's wars. Specifically, the Air Force can benefit by examining the F-15C and its single role. It should determine if the F-15C can do more than just shoot down aircraft and if so, should it? Recent combat successes highlight two essential ingredients to winning an air campaign, air superiority and precision engagement. Gaining air superiority provides a sanctuary from which, precision engagement can be accomplished. These experiences have also shown our emphasis to gain ownership of the sky early in a conflict. The F-15C has played a major role in gaining control of the sky over the years. Questions now remain regarding the usefulness of the F-15C once air superiority is achieved. Could this aircraft have contributed more in other roles during the recent conflicts? What should F-15C provide in future conflicts once air superiority is achieved or in lesser intense conflicts where ownership of the sky is not an issue. The F-15C was originally designed with an air-to-ground capability but a conscious decision was made to train exclusively in the air-to-air role due to the Soviet threat. The world is now a different place and consequently a new approach to readiness is in order. The Navy and the Air National Guard have captured this new vision and are taking an approach to expand new capabilities of their current weapons systems. The Air Force should look at the Navy's F-14 role expansion as a possible model for the F-15C. In doing so, the F-15C may offer even more combat capability to war fighting commanders and continue to add to their growing list of combat accomplishments. Forces may continue to shrink while direct fighter involvement in the world may continue a growth trend. If this happens, it will become even more critical for our leaders to become better stewards of the limited resources entrusted to them.					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:		17. LIMITATION OF ABSTRACT Public Release	18. NUMBER OF PAGES 56	19. NAME OF RESPONSIBLE PERSON Fenster, Lynn lfenster@dtic.mil	
				19b. TELEPHONE NUMBER International Area Code Area Code Telephone Number 703767-9007 DSN 427-9007	
a. REPORT Unclassified	b. ABSTRACT Unclassified	c. THIS PAGE Unclassified			
				Standard Form 298 (Rev. 8-98) Prescribed by ANSI Std Z39.18	

## **Disclaimer**

The views expressed in this academic research paper are those of the author(s) and do not reflect the official policy or position of the US government or the Department of Defense. In accordance with Air Force Instruction 51-303, it is not copyrighted, but is the property of the United States government.

## *Contents*

	<i>Page</i>
DISCLAIMER .....	ii
LIST OF ILLUSTRATIONS .....	v
PREFACE .....	vi
ABSTRACT .....	viii
INTRODUCTION .....	1
Air Superiority .....	2
Air Supremacy and Superiority .....	2
F-15C EVOLUTION .....	5
F-15 Origin .....	5
Untapped F-15 Air-to-Ground Capabilities .....	6
F-15 Computed Delivery System .....	8
Automatic Delivery Mode (AUTO) .....	9
Continuously Displayed Impact Point (CDIP) Mode .....	10
F-15 Roles and Missions .....	12
THE F-15C CONTRIBUTION IN COMBAT .....	17
F-15 Contribution to the Gulf War .....	18
Excess Sorties .....	19
PGM Shortages .....	20
It Almost Happened .....	23
Multi-mission Training .....	24
F-15C Contribution over Bosnia .....	26
EXPANDING MISSIONS, REMAINING RELEVANT .....	30
Air National Guard .....	30
Multi-Role F-14 Tomcat .....	32
AIR-TO-GROUND OPTIONS FOR THE F-15C .....	35
Suppression of Enemy Air Defenses .....	35
Medium Altitude PGM Employment .....	37
LANTIRN Targeting Pod Employment .....	38
Future Munitions .....	39

CONCLUSION .....	41
BIBLIOGRAPHY .....	43

## *Illustrations*

	<i>Page</i>
Figure 1. Potential F-15C Air-to-Ground Load Profile .....	6
Figure 2. F-15 External Store Options.....	7
Figure 3. F-15 Specified Stores.....	8
Figure 4. Auto Delivery .....	9
Figure 5. CDIP HUD Display .....	11

## *Preface*

The central question this paper attempts to answer is this; can the F-15C Eagle do more than shoot down aircraft and if so, should it? I started asking this question over six years ago after my participation in Operation DESERT STORM as an F-15C flight lead. During that experience I, like so many other Eagle Drivers, endured countless hours patrolling the skies of Iraq in search of that elusive MiG, only to come up short, 58 times. During my 356 hours of combat, the only thing I expended (in anger) during my entire war experience was chaff and flares. I killed and destroyed nothing while dodging my way through walls of Anti-Aircraft-Artillery (AAA) and ballistic Surface to Air Missiles (SAM) launches. I came home from this experience somewhat empty. I knew my contribution was important but I couldn't get rid of the feeling that I might have somehow contributed more.

Over the years since then this same question kept surfacing. Especially as I watched many F-16 staffers (affectionately known by Eagle Drivers as the Viper Mafia) make force structure decisions favoring the multi-role F-16 over the F-15C. In their judgment the newly acquired Advanced Medium Range Air-to-Air Missile (AMRAAM) weapon made the "now truly multi-role" F-16 an equal air-to-air replacement for the F-15C. While I knew, because of certain classified capabilities, these well meaning staffers could not understand how much better the F-15C is in the air-to-air role, I could not disagree with the fact that in many situations the multi-role F-16 provided better selection of combat

options. I knew the F-15C was technically able to do more than just shoot down aircraft. What I didn't know, was how easy it was to accurately deliver current air-to-ground weapons.

After transitioning from the F-15C to the F-16, I learned first hand that today's air-to-ground weapons can be employed, given the correct environment, with a great deal of ease. It is my opinion, that in light of today's threat, budget realities of the present, and our growing tendency to become more engaged in the world, we do our country a disservice if we do not think of ways to get the most out of our existing weapon systems.

It is my desire that the reader will contemplate this thesis, not only as it applies to the F-15C, but also as it may apply to the flexible employment of other weapon systems, present and future. As defense dollars become harder and harder to justify, we must demonstrate stewardship to those we serve by thinking of innovative ways to project air power.

I want to thank two senior officers who have influenced me in more positive ways than they will know. To General Lorber who, while suffering through my vain attempts at becoming a good Exec Officer, saw fit to complete my fighter experience by making me an air-to-ground pilot. To General Ryan, who helped me deal with the death of one of my precious pilots and for showing me how to "think out of the box" as my Joint Forces Air Component Commander. Thank you both.



### *Abstract*

In an era of declining budgets, reduced force structure, and lessened air threat, our smaller force must be more flexible and bring more to the fight. A careful look of all our single-mission platforms must be made if we are to expect to retain the capability to decisively win our nation's wars. Specifically, the Air Force can benefit by examining the F-15C and its single role. It should determine if the F-15C can do more than just shoot down aircraft and if so, should it?

Recent combat successes highlight two essential ingredients to winning an air campaign, air superiority and precision engagement. Gaining air superiority provides a sanctuary from which, precision engagement can be accomplished. These experiences have also shown our emphasis to gain ownership of the sky early in a conflict. The F-15C has played a major role in gaining control of the sky over the years. Questions now remain regarding the usefulness of the F-15C once air superiority is achieved. Could this aircraft have contributed more in other roles during the recent conflicts? What should F-15C provide in future conflicts once air superiority is achieved or in lesser intense conflicts where ownership of the sky is not an issue.

The F-15C was originally designed with an air-to-ground capability but a conscious decision was made to train exclusively in the air-to-air role due to the Soviet threat. The world is now a different place and consequently a new approach to readiness is in order.

The Navy and the Air National Guard have captured this new vision and are taking an approach to expand new capabilities of their current weapons systems. The Air Force should look at the Navy's F-14 role expansion as a possible model for the F-15C. In doing so, the F-15C may offer even more combat capability to war fighting commanders and continue to add to their growing list of combat accomplishments.

Forces may continue to shrink while direct fighter involvement in the world may continue a growth trend. If this happens, it will become even more critical for our leaders to become better stewards of the limited resources entrusted to them.

## Chapter 1

### Introduction

*....to have command of the air is to have victory.*

—Douhet

We in the Air Force believe the first step in winning any modern conflict is to obtain the freedom to conduct combat operations over the enemy's territory at the time of our choosing. In addition to achieving unencumbered access to enemy skies, it is equally important to deny the enemy any tactical use of our sky.

History has shown that the nation in combat who owns the sky, wins the war. USAF Colonel Phillip Meilinger, in his *10 Propositions Regarding Air Power*, placed control of the air the number one tenant to achieving victory. His first tenant, "Whoever controls the air generally controls the surface," argues that total command of the air is required in order to achieve victory regardless of whether the battle is over land or sea.<sup>1</sup> He supports this argument with numerous historic examples proving the validity of the proposition. It is significant to note that since World War II, no country has won a war against an enemy who achieved air superiority.

The United States Air Force (USAF) believes this doctrine and has equipped and trained itself to achieve control of the skies for many years. As a result, no US soldier has

ever died from a weapon released from an enemy aircraft in over forty years.<sup>2</sup> It is the Air Force's intent to maintain this trend as it continues to train and equip its force to do this.

## **Air Superiority**

The entire USAF vision of global power projection for the future is based on the capability to apply several core competencies, the first of which is Air Superiority.<sup>3</sup> In order to fully appreciate the how Air Superiority contributes to power projection it will be useful to define this term as it applies to the war fighter and to any Joint Air Component Commanders (JFACC).

### **Air Supremacy and Superiority**

...*Air supremacy* is that degree of air superiority wherein the opposing air force is incapable of effective interference anywhere in the given theater of operations. *Air superiority* is that degree of dominance in the air that permits friendly land, sea, and air force to operate at a given time and place without prohibitive interference by opposing force. While air supremacy is most desirable, it may exact too high a price. Air superiority often can provide sufficient freedom of action that leads to success in warfare.<sup>4</sup>

As previously shown, the ability to control the sky of the enemy is essential to war fighting commanders in achieving victory in combat. Perhaps there is no better example of this concept in action than the Gulf War Air Campaign Plan. During the early stages of this air campaign, planners counted on hundreds of sorties and assets to systematically take out the eyes and ears of Iraq's Integrated Air Defense System (IADS). One of the major contributors to this cohesive plan was the McDonnell Douglas F-15C Eagle.

Flown from three forward deployed bases in Saudi Arabia and one in Turkey, the F-15C rapidly earned respect by Iraqi fighter pilots and the rest of the world. F-15C pilots shot down 14 enemy fighters in the first week of the war.<sup>5</sup> It became obvious to Saddam

Hussein early in the war, that nearly every Iraqi fighter that faced the F-15 did not return. The F-15C was clearly superior to anything Iraq had to offer.

To date, there is not a single air-to-air fighter built that has enjoyed a more absolute success in aerial combat than the F-15C.<sup>6</sup> In total, this aircraft is directly responsible for over 120 aerial combat victories yet has never been shot down. Whether flown by allied nations such as Israel, Saudi Arabia, or the USAF, the F-15C has proven to be the quintessential air superiority fighter. Its long range, powerful look-down/shoot-down radar, and strong selection of the latest air-to-air weapons make this fighter the weapon system of choice by those who possess it. At least it becomes the weapon system of choice while there are still enemy airplanes to shoot down.

What happens however, if an enemy quits employing his aircraft and chooses to hide and protect his forces for later? Is the F-15C the weapon of choice when the enemy is not permitted to fly its aircraft because of a United Nations Security Resolution? What does a combat commander do with an aircraft like the F-15C once air superiority has been achieved? Once the air war is won, what should be done with the world's most capable air-to-air fighter?

This paper will explore this issue with regard to the F-15C and will offer potential air-to-ground employment options. To do this, chapter two looks at the developmental history of the F-15. It describes the original air-to-ground capabilities that came as standard equipment on all air-to-air F-15s. The chapter concludes by reviewing the evolutionary path the Air Force has taken on the F-15C's journey to become exclusively an air-to-air fighter.

Chapter three discusses the contribution of the F-15C in the most recent combat actions over Iraq and Bosnia. It also discusses the growing need for medium altitude Precision Guided Munitions (PGM) capable platforms and suggests how the F-15C might have contributed to this need.

Chapter four looks at how other non-PGM fighters are expanding their capabilities to fill this growing need. It does so by reviewing our Air National Guard's (ANG) approach to filling this void with their non-precision capable F-16s and finishes by showing how the Navy is giving a PGM capability and mission to their air-to-air F-14s.

Chapter five suggests several broad air-to-ground employment options for the F-15Cs that if used could allow it to contribute more fire power to the fight. Chapter six finishes by drawing conclusions on the issue of expanding the role of the F-15C.

While this paper directly relates the issue to the F-15C fleet, it hopefully will prove timeless as we face modernization challenges.

### Notes

<sup>1</sup> Colonel Phillip S. Meilinger, *10 Propositions Regarding Air Power*, Air Force History and Museums Program, 1995, 3.

<sup>2</sup> Ibid., 4.

<sup>3</sup> Air Force Doctrine Document, *Air Force Basic Doctrine*, Second Draft, 21 May 1996, 10.

<sup>4</sup> Ibid., 10.

<sup>5</sup> Bert Kinzey, *The Fury of Desert Storm: The Air Campaign* (Blue Ridge Summit, Pa.: Tab Books, 1991), 154.

<sup>6</sup> For the purposes of this paper I have referred to the Air-to-Air version of the F-15 as the F-15C. In fact the F-15A/B/C/D are all air-to-air Eagles. The F-15C is the current upgraded version of the single-seat A Model. The F-15D is similarly an updated two-seat version of the F-15B. To date, largely all A/B Models have been deactivated.

## **Chapter 2**

### **F-15C Evolution**

#### **F-15 Origin**

The F-15A, Air Superiority Fighter entered the USAF inventory in the early 1970s, largely in response to the Soviet Union's fighter growth and modernization, but also as a result of our poor air-to-air performance in Vietnam. During the F-15's initial concept formulation phase in the mid 1960s, HQ Air Force, Air Force Systems Command, and Tactical Air Command began to define the capabilities for the F-X<sup>1</sup>

This new concept fighter floundered in the acquisition phase as various participants argued over funding and capability requirements. However, the entire project was given a boost by the Soviet Air Show at Domodedovo Air Base in 1967. The Soviet's unveiling of their second generation of fighters, particularly the MiG-25 Foxbat, vectored the F-X program towards an air-to-air emphasis.<sup>2</sup> McDonnell Douglas was given the go-ahead to produce the USAF F-X and rolled out their first aircraft in 1972, designated the F-15.

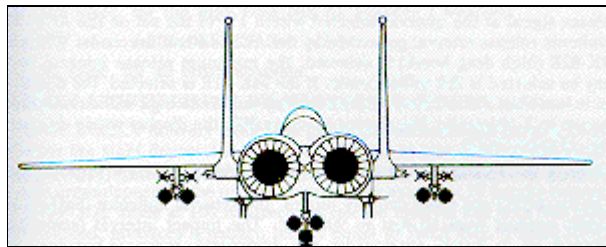
During the roll-out celebration, the Honorable Grant L. Hansen, Assistant Secretary of the Air Force, Research and Development, gave the following statement regarding the capability of the new F-15.

...Under the skilled hands of the Air Force pilots, this single purpose aircraft will preserve the superiority we have become accustomed to in

aerial combat. It will out-climb, out-maneuver, and out-accelerate any fighter threat in existence or on the horizon...<sup>3</sup>

History has shown these words to be quite prophetic. However, the specified requirements for this new fighter not only resulted in the creation of a superior air-to-air platform but also a superb air-to-ground weapon system as well.

### **Untapped F-15 Air-to-Ground Capabilities**




**Source:** McDonnell Douglas Product Service Publication (PS 940), *F-15 Armament Handbook* (St. Louis, Mo., 1979), 10-29.

**Figure 1. Potential F-15C Air-to-Ground Load Profile**

Each F-15 was built with sophisticated avionics package that included a very advanced and accurate surface attack weapon system. This capability was resident in all F-15A/B software and hardware from the outset. Over the years, F-15A/Bs were replaced with newer F-15C/Ds. These newer F-15C/Ds were designed to be upgradable through a Multi-Stage Improvement Program (MSIP). In the early stages of the MSIP program, the F-15C/Ds retained the original air-to-ground software.



**FIGURE 5-1  
EXTERNAL STORES**



Stores	Weight lbs.	Stations								Total
		9	8	7	6	5	4	3	2	
<b>Air-to-Air Missiles</b>										
AIM-7F	510		1	1		1	1			4
AIM-9J	170	2						2		4
AIM-9J-1	165	2						2		4
AIM-9L	191	2						2		4
<b>General Purpose Demolition Bombs</b>										
MK-82 LDGP	906	6			6			6		18
MK-82 Snakeye	550	6			6			6		18
MK-84 LDGP	1970	1			1			1		3
<b>Fire Bombs</b>										
BLU-278/B (Finned)	829	3			3			3		9
BLU-278/B (Unfinned)	799	3			3			3		9
<b>Guided Weapons</b>										
MK-84 EO (GBU-8/B)	2293	1			1			1		3
MK-84 Laser (GBU-10A/B, B/B)	2053	1			1			1		3
<b>Dispensers</b>										
CBU-52 B/B	785	4			4			4		12
CBU-58/B	810	4			4			4		12
CBU-71/B	810	4			4			4		12
MK-20 Rockeye II	486	6			6			6		18
<b>Training</b>										
SUJ-20B/A (Bombs Only)	418	1			1			1		3
<b>Fuel Tank</b>										
500 Gallon (Empty)	320	1			1			1		3
<b>ECM Pod</b>										
ECM Pod (AN/ALQ-119(V) 12)	580	1			1				1 or 2*	

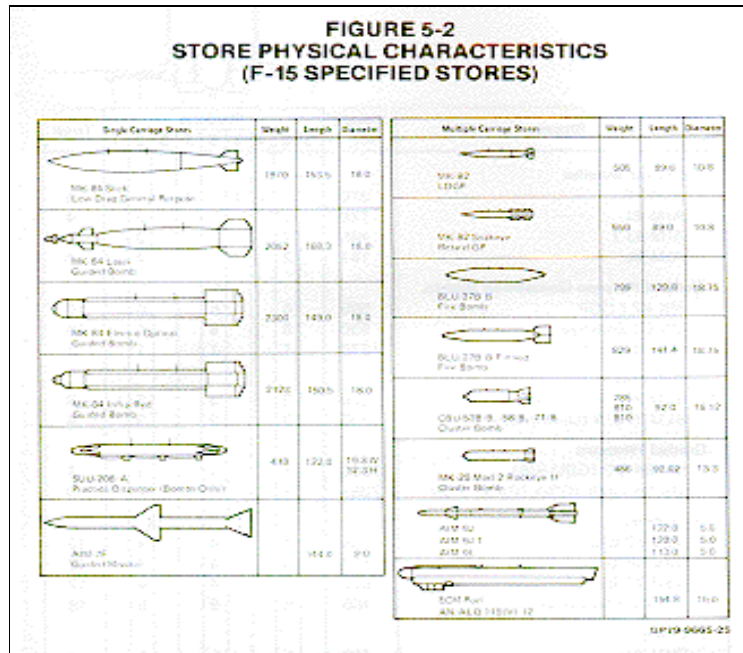
\*Cannot be carried on wing and centerline at the same time.

CP-79-5663-24

**Source:** McDonnell Douglas Product Service Publication (PS 940), *F-15 Armament Handbook* (St. Louis, Mo., 1979), 5-1.

**Figure 2. F-15 External Store Options**

This software contained the ballistic models for a wide range of air-to-ground weapons. As indicated in Figure 2, the F-15C can carry and employ bombs from three external carriage stations. With the use of multiple ejector racks, several bombs can be loaded on each station. Depending on the size of the weapon used, the F-15 can carry up to eighteen bombs.



**Source:** McDonnell Douglas Product Service Publication (PS 940), *F-15 Armament Handbook* (St. Louis, Mo., 1979), 5-2.

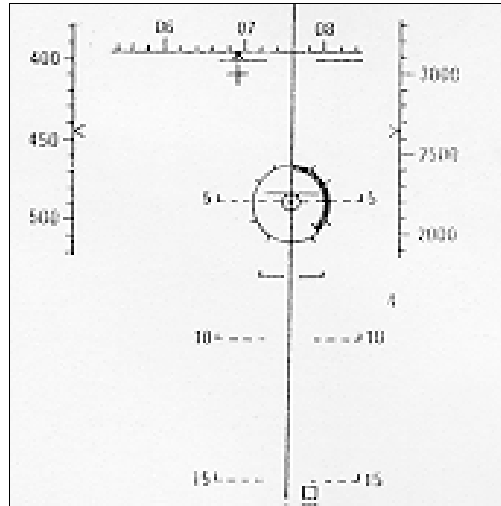
**Figure 3. F-15 Specified Stores**

Not only can the F-15 carry numerous air-to-ground weapons, it can also employ a wide variety of weapons. The illustration shown at figure 3, from the original F-15 weapons handbook, shows the many options available in the early F-15s.

## F-15 Computed Delivery System

The F-15 avionics suite was fitted with two sophisticated computed delivery modes and two back-up or manual delivery options. Of course, the gun was expected to also be included as an air-to-ground weapon option so a computed strafe display was also available. The two computed delivery systems discussed here are the automatic delivery mode, known simply as “Auto,” and the Continuously Displayed Impact Point (CDIP) mode.

## Automatic Delivery Mode (AUTO)



**Source:** McDonnell Douglas Product Service Publication (PS 940), *F-15 Armament Handbook* (St. Louis, Mo., 1979), 10-2.

**Figure 4. Auto Delivery**

The Auto mode is a computed delivery mode that provides steering queues and weapons release signals automatically. The pilot flies to the correct bomb release point by following the wind corrected steering data displayed in the Heads Up Display (HUD) or on navigation instruments. By centering the steering line, the F-15 will eliminate any left and right (3/9 o'clock) impact errors. The short and long (6/12 o'clock) impact errors are eliminated through an automated release of the bombs at the correct moment. Figure 4 shows an example of an F-15 HUD display during a five degree dive delivery using the Auto mode.

In the auto mode, the F-15's Central Computer (CC) is the brain of the system. The pilot tells the CC where the target is by either inserting the target's coordinates into the CC or by slewing radar display cross hairs over the desired target. A pilot can also

accomplish this visually by slewing the HUD's target designator box over the intended target.

Once this is accomplished, the CC continuously compares flight parameters with relation to target location and automatically sends a release signal to the bomb stations at the required time. This computation is accomplished regardless of aircraft dive angle or speed. In simple terms, all the pilot has to do is designate the target, zero out any azimuth steering errors, and hold down the "Pickle Button" (weapons release button) while flying over the target. The CC compute and releases the bombs at the proper time with great accuracy.

At 6,000 feet slant range, for example, the system has shown consistency of dropping unguided bombs within a 21 feet radius of the target.<sup>4</sup> The miss distances grow slightly as slant range is increased. This is particularly true when actual winds differ from the predicted bomb fall wind model. However, the miss distances, even at high altitude have proven to be well within the required parameter to accurately employ Laser Guided Bombs (LGB).

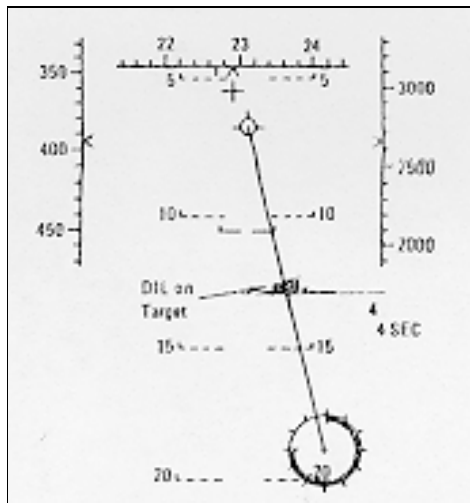
Because this mode does not require visual contact with the target, it is possible to conduct blind bombing of known coordinates, through an undercast cloud layer. Obviously, the condition of the battlefield, Rules of Engagement (ROE), or potential of collateral/friendly damage could prohibit the employment of blind bombing techniques.

### **Continuously Displayed Impact Point (CDIP) Mode**

The second computed delivery mode is the CDIP mode. This mode is primarily a visual mode. The system automatically presents in the HUD a continuously displayed impact point than equates to the spot on the ground where bombs would impact if they

were release at that moment. This is accomplished by the CC computations using radar ranging and current flight parameters. In addition to presenting continuously displaying impact point in the HUD, the system computes and displays a bomb impact line. This is used to assist the pilot to eliminate any 3/9 o'clock impact errors. While the display is continuously computed, bomb release is not automatic. To accurately drop a bomb in this mode a pilot must fly his F-15 to the desired release dive angle, make azimuth corrections by using the displayed impact line and hit the pickle button at the precise moment the CDIP passes over the target.

Figure 5 shows a HUD CDIP mode attack. The pilot has established the desired dive angle and has correct any 3/9 error by placing the Desired Impact Line (DIL) over the target. As the F-15 nears the target, the CDIP will track to the target. The pilot depresses the pickle button when the displayed impact point is on the target. While the CDIP mode is a very accurate mode, it does require much pilot proficiency, skill, and timing to reduce miss errors. It also requires visual line-of-sight with the target.



The CDIP mode is normally used in an environment where real-time sighting of a target is required. In a Close Air Support (CAS) environment, an orbiting fighter would use this mode while attacking visually acquired targets. Target coordinates are not required in this mode.

Both the Auto and CDIP mode can compute bomb solutions for simultaneous release options as well as sequential or “ripple” release solutions. If a target requires a string of bombs across it to destroy it, the F-15 CC can calculate release intervals automatically to achieve the desired impact pattern, regardless of altitude or dive angle.

The F-15 has two other non-computed modes that are principally used as backup as well as a gun strafe mode. These will not be discussed.

## **F-15 Roles and Missions**

If the F-15C was blessed with such an advanced air-to-ground system, then why wasn't it given an air-to-ground mission? To fully appreciate the answer to this question it is important to review the threat environment during the F-15's early history.

As previously mentioned, the Soviet Union had embarked on a fighter modernization program in the wake of our less than optimum performance in Vietnam. After careful analysis of why our pilots did not enjoy the same air-to-air kill ratio in Vietnam they enjoyed in the Korean conflict, the Air Force determined the primary weakness was caused by a lack of dedicated air-to-air training.

The USAF began a long effort to correct this shortfall by taking a path of mission specialization. The threat we faced in Central Europe was enormous and fairly high-tech. We believed that an air war in Europe would require a specialized force to aggressively

pursue concurrent interdiction, CAS, and air superiority missions. General Momyer, the commander of Tactical Air Command (TAC) concluded we needed a large number of specialized fighters that could be employed simultaneously against the Soviet threat.<sup>5</sup> We needed air-to-air experts who had no other mission to train for. Statistically, fighter units who specialized in air-to-air, as a single role historically did better than units having a multiple missions.<sup>6</sup>

In 1972, fighter squadron commanders and weapons officers met to discuss the effectiveness of the force's roles and missions and concluded that,

Optimized training was to be based on reducing the number of roles required in multipurpose tactical aircraft. Aircrews would concentrate primarily on either the air-to-air or air-to-surface role, but not on both. They would maintain a secondary but less demanding capability in the other role.<sup>7</sup>

In 1975 the Secretary of Defense, James Schlesinger and Air Force Chief of Staff, David Jones decided to build a force based on a high-low cost mix. A few high cost F-15s would be complimented with many low cost F-16s and A-10s. He also agreed that each aircraft should be optimized for specific roles yet retain inherent capabilities in other roles.<sup>8</sup>

As pilots began to fully appreciate the capabilities of the F-15's superior radar system, it became obvious that in order to fully maximize the F-15 as a weapon system, pilots had to devote complete attention to the task. While flying the aircraft was much easier than older F-4 Phantoms, employing the new long range radar in a single-seat fighter required a growth in tactics and employment and much more attention. Thus, we marched down the path of specialization and F-15 pilots began vigorous training in all aspects of air-to-air employment. Only a few pilots ever touched the air-to-ground buttons in the cockpit.

When they did, it was usually to send the radar into a ground map mode for navigation. No air-to-ground training was ever accomplished.

However, the world began to change through the years that required a corresponding change to our military strategy. This change also required an unprecedented demonstration of the flexibility of air power.

As a result of the American hostage situation in Iran, our military leaders determined that possible military action might be required in places other than Central Europe. While we had a robust forward basing of military capabilities in Europe, we lacked the ability to respond rapidly to other hot spots in the world.

We fixed this problem by building a Rapid Deployment Force (RDF), later named the Rapid Deployment Joint Task Force (RDJTF). This force consisted of several specified units tasked to deploy at a moments notice, anywhere in the world and conduct combat operations until reinforcements arrived. In order to keep the force small, rapid, yet flexible we decided that a designated F-15C squadron would be multi-mission capable. The hidden air-to-ground capabilities were explored and pilots were trained to drop bombs from the F-15C.

A selected number of pilots checked out in this new mission. The initial cadre of pilots had previous air-to-ground experience in other aircraft. As they began to explore the capabilities of the attack systems they quickly learned this system was not only very accurate, but easy to employ. As a result, several pilots qualified in minimum time and became the first F-15 mud movers. The new F-15 role gave leaders additional options and demonstrated the true flexibility of air power.



The air-to-ground role of the F-15 took on a more dominant role for a short period of time. By the mid 1980s the planners, understanding the inherent air-to-ground capability of the F-15C, began exploring ways to modernize or enhance the F-15, giving it even more capability. Developers took one of the original two-seat F-15B models and completely replaced the avionics systems and optimized the radar and weapon delivery systems for air-to-ground. The aircraft was enhanced with the addition of a Weapon Systems Operator (WSO) and given a new designation, the “enhanced” F-15. Coincidentally the next designation in the series of F-15A/B/C/D was the F-15E, for “enhanced.”

The new F-15E proved to be so successful that the USAF funded it and named it the “Strike Eagle.” This new fighter had a reversed focus from the F-15C. It specialized in air-to-ground while retaining capabilities in air-to-air. As this new fighter began the journey to Initial Operational Capability (IOC), the F-15C community returned to full time air-to-air role. F-15C air-to-air software updates have grown over the years to the point where air-to-ground data space is now gone. Currently, the F-15C software would have to be changed if we wanted to restore the air-to-ground capability.

### Notes

<sup>1</sup> Col Roy S. Dickey, *The Advocacy of the F-15*, Air War College, Air University, April 1973, 1.

<sup>2</sup> Ibid. 45.

<sup>3</sup> Quoted in Col Roy Dickey, *The Advocacy of the F-15*, AWC Report 4893 (Maxwell AFB, Ala.: Air War College, 1973), 1.

<sup>4</sup> Maj Stanton T. Smith III, USAF, *F-15 Surface Attack Systems*, Air Command and Staff College Report 85-2530 (Maxwell AFB, Ala.: Air University, 1984), 29.

<sup>5</sup> Maj Michael W. Ford, USAF, *Air-to-Air Combat Effectiveness of Single-Role and Multi-Role Fighter Forces*, (Fort Leavenworth, Ks.: US Army Command and General Staff College, 1980), 72.

<sup>6</sup> Ibid., 76.

## Notes

<sup>7</sup> Quoted in Ford, 73.

<sup>8</sup> Ibid.

## Chapter 3

### The F-15C Contribution in Combat

*We're not in the business of being defensive when we engage. We want to take the fight to the other guy and we are going to dominate his airspace. We will operate in it and he will not.*

—General Ron Fogleman

Total dominance, whether temporary or permanent, can only be achieved by a carefully orchestrated application of Offensive and Defensive Counter Air (OCA, DCA) forces. This force package includes all types of air-to-air and air-to-ground assets striking enemy defenses and eliminating the effectiveness of enemy command and control systems. Radars are targeted. Bunkers are targeted. Airfields are targeted. Defensive surface-to-air assets are targeted.

Shooting down airplanes is only a small subset of this large effort to gain air dominance. If planned correctly, the use of stealth and surprise may result in little to non-existent air-to-air action. In a perfect world, our forces should eliminate an enemy's ability to employ its aircraft before they can even get off the ground, leaving nothing for the single-role air-to-air fighters to do. If we expect to achieve rapid airspace dominance in future conflicts, we must look at alternative ways to employ F-15Cs once air superiority has been achieved. This chapter looks at how the F-15C might have contributed to the growing PGM requirement in Gulf War and combat operations over Bosnia.

## **F-15 Contribution to the Gulf War**

There is not a single F-15C pilot who is not ready stand with pride and boast of the 37-0 kill ratio enjoyed during Operation DESERT STORM. Whether the Iraqi Air Force attempted to attack or run, F-15Cs seemed to be there to spoil Saddam's efforts. Air superiority was achieved by the end of Air Tasking Order (ATO) Day 1. Ten days later, Gen Schwarzkopf declared air supremacy.<sup>1</sup> As successful as the F-15C was in contributing to air supremacy, it is worth exploring how this fighter could have contributed even more to the overall air campaign.

During the Gulf War, F-15C pilots had one mission, force protection. This primary mission was tasked both offensively and defensively. OCA F-15Cs were tasked to escort large strike packages of allied fighters into Iraq. They did this by preceding ingressing attack aircraft packages, sweeping the skies of any enemy fighters. When they reached the target area, F-15Cs established a protective Combat Air Patrol (CAP), placing F-15C protection between the strike package and known enemy airfields. When the attacks were finished, F-15C provided protection as the package egressed Iraq.

As a part of defensive force protection, DCA F-15Cs were tasked to protect High Value Airborne Assets (HVAA), such as our airborne early warning, reconnaissance, and tanker aircraft. In addition, they were tasked to protect allied ground forces from any Iraqi attempt to strike these positions. Both OCA and DCA missions accomplished one thing, protection from enemy air. F-15Cs did a great job of this throughout the war. However, most of any threatening air activity took place in the early stages of the war.

Over forty percent of the Coalition air-to-air kills happened during the first week of the war.<sup>2</sup> As a result of these losses, Saddam grounded his forces in an attempt to

preserve his fighters for later use. His fighters were relocated, some near politically protected holy sites. Others were flown to safety in Iran. During this period the F-15C began flying Barrier Combat Air Patrols (BARCAP) between Baghdad and Iran in attempt to shoot down escaping Iraqi fighters. Some Iraqi fighters were shot down during this period. Consequently, fewer and fewer enemy fighters took to the sky.

Since Saddam refused to fly his fighters, we began a campaign to bomb enemy fighters in shelters. This required a significant shift of PGM capable fighters and a subsequent delay in the air plan. This effort achieved great success. PGM droppers killed more enemy fighters than all the air-to-air kills combined. Of the approximately 403 Iraqi aircraft lost, 250 were destroyed on the ground, 121 escaped to Iran, while the remaining few were shot down in aerial combat.<sup>3</sup>

F-15Cs flew 5,685 sorties during the Gulf War, of which only 29 resulted in downing any aircraft.<sup>4</sup> Since several aerial engagements resulted in multiple kills, only 25 F-15C pilots scored kills during the war. In light of these numbers, there is little doubt that if the F-15C units had a secondary air-to-ground mission it may have contributed more to the overall success of the air campaign. An issue would have been where to steal air-to-air sorties from.

### **Excess Sorties**

The skies over Iraq became extremely crowded during the early stages of the air campaign. Initially, F-15C HVAA CAPs were located just south of the Iraqi/Saudi border. The only F-15Cs destined to fly north were OCA escort missions as a part of strike packages. However, because of the unbelievable success achieved in the opening

hours of the first night, HVAAAs and their F-15 protection were directed 150 mile north into Iraq.

This move north placed DCA F-15s in the same airspace as some OCA F-15s. This was particularly true when the targets were located in southern Iraq. On one occasion an F-15C four-ship was unable to depart their bed-down location at Al Kharj, Saudi Arabia in time to meet their OCA tasking. The flight lead radioed AWACS and coordinated for four DCA F-15Cs, flying in the same area, to take the tasking.<sup>5</sup>

Even though the skies over Iraq became quite crowded with allied air, Lt Gen Horner, the Joint Forces Air Component Commander (JFACC), never released F-15s from their OCA escort tasking. As a result, many F-15C escort missions occupied the same sector of sky, performing the same basic mission, of shooting down any threatening aircraft. Continuous DCA F-15C coverage in various sectors would have been enough presence to free some OCA F-15s for other uses.

### **PGM Shortages**

One of the shortages in the Gulf War was the availability of PGM dropping platforms. The F-15E Strike Eagle entered the war as a new weapon system with great PGM delivery potential. This great potential resided primarily in an externally loaded Low Altitude Navigation Targeting Infra-Red for Night (LANTIRN) system. This system consisted of two pods, the navigation (nav) pod and the targeting pod.

Unfortunately, the conflict began before the most critical piece of delivery system, the targeting pod, was completely fielded. This pod is vital to LGB delivery because it guides the bomb to the target. When the two F-15E squadrons deployed to the Gulf they were only equipped with the Nav Pod.

Contractors began a major effort to speed up the targeting pod production process and were able to field a few targeting pods shortly after the commencement of hostilities. As a result, most F-15Es only carried the nav pod. In order to provide a PGM capability, the F-15E formations began using “buddy-lase” tactics. Aircraft without a targeting pods simply dropped their LGBs on target coordinates while F-15Es with a targeting pods guided the bombs into the target. Although this meant the F-15Es needed to stay in the target area longer, it proved effective and contributed to the growing need for PGM employment. Air superiority allowed an environment where targeting pod equipped fighters could safely stay over the target area to lase other fighter’s bombs.

The need for LGBs grew throughout the campaign beyond the original plan, largely due to events that took place as the plan was executed.<sup>6</sup> There were three significant changes to the air campaign that produced a growing need for PGM employment. A need that might have been augmented by the F-15C. The first change came as a result of the Iraqi Scud launches into Israel. In an attempt to keep Israel out of the war, the United States promised to devote air assets to hunt down and kill these mobile missile systems. The F-15Es were the primary player in this new Scud CAP mission. Every sortie diverted to this mission meant fewer PGM targets could be serviced. Some F-15Cs, carrying PGMs, could have easily rolled into the air-to-ground effort using medium altitude buddy-lase tactics with targeting pod equipped F-15Es.

The second unplanned change to the air-campaign came as a result of heavy losses sustained by coalition fighters while flying in the low altitude environment. While most Surface-to-Air Missile (SAM) systems were suppressed by various Wild Weasel assets,

much of the threat came in the form of AAA and hand-held Infra-Red (IR) SAMs, making employment below 15,000 quite hazardous in many areas.

In an effort to reduce allied losses, the decision was made to establish a minimum altitude for all employment. This had significant negative effects on the accuracy of non-PGM capable attack aircraft. The ability to kill a target from medium altitude was reduced, requiring additional sorties and bombs to achieve the same effect. It quickly became apparent that in order to be successful from medium altitude, more PGMs or LGBs were needed.

Because air superiority was achieved, platforms like the F-111 were able to safely operate over a target area at medium altitude and strike with lethal precision. Planners demonstrated tremendous flexibility by rolling these low-altitude interdiction fighters into medium altitude “tank-plinking” role. Clearly, the weapon of choice became LGBs to attack armor and tanks. A four-ship of F-15Cs could have brought to the fight air defense weapons as well as twenty-four (six each) GBU-12 (500 lb. LGBs) bombs to be employed in a “buddy-lase” effort. These additional bomb droppers would have been useful.

The third unexpected change to the air plan came as a result of unexpected stand-down of the Iraqi Air Force. Lt Gen Horner was concerned that Saddam was attempting to save his fighters and employ them in an attack role with chemical munitions when our ground phase began. Consequently, on 23 January he diverted many PGM missions from the original target plan and began attacking aircraft shelters with most of his PGM fighters, primarily F-117s and F-111s, and some F-15Es.<sup>7</sup>

Saddam possessed over 600 hardened shelters and the entire shelter busting effort conducted by the existing PGM assets were able to destroy only 60 percent of them.



Perhaps more could have been destroyed if F-15C escort aircraft brought additional GBU-10s to the fight. A four-ship of F-15C escorting fighters could have brought a total of eight more weapons to the fight.

### **It Almost Happened**

At one point it looked as if the use of F-15C in a bombing role might actually happen. The Bitburg F-15Cs, deployed to Al Kharj, Saudi Arabia, were a part of a composite Provisional Fighter Wing. In addition to these 24 F-15Cs, the wing possessed all of the war's F-15Es.

Once air supremacy was achieved, discussions about the possible use of the F-15Cs as LGB delivery systems was conducted. Lt General Horner reasoned that since the Iraqi Air Force had been defeated, little remained for the F-15Cs to do.<sup>8</sup> During a visit to Al Kharj, Lt Gen Horner suggested that the Bitburg F-15Cs could operate with F-15E in a buddy-lasing mission.

The concept of operations included F-15C aircraft in the same formation with F-15Es. The F-15E pilots were to direct the F-15C pilots to release their bombs and the terminal guidance would be achieved by the F-15Es. While highly controversial, this discussion continued to the point where bombs were actually rolled out to F-15Cs for load crew training.<sup>9</sup>

Had planners fully understood the results of correct application of air power in a major conflict, we might have been visionary enough to have trained F-15C units in this secondary air-to-ground role.

Other, designated air defense platforms were rolled to an air-to-ground role and provided the flexibility needed. For example, the Canadian CF-18, a multi-role fighter,

was designated exclusively as an air-to-air asset prior to the war. As we took control of the skies, however, these fighters were switched to dropping bombs.

Probably the most striking example of mission flexibility was the use of Saudi F-15Cs. The Saudi Government faced a different threat than the United States did when considering the possible combat use of their F-15Cs. Consequently, they purchased this aircraft with full intentions of using the air-to-ground capability in combat. As a result, they trained for this mission and were actually used in the air-to-ground war during the Gulf War.<sup>10</sup>

### **Multi-mission Training**

The key to their ability to change role was training. No one can really fault the USAF leadership for single air-to-air focus. The threat, as previously described, required full time, air defense experts who could manage multi-targeting radar tasks while intercepting numerically superior fighter/bombers packages.

Many studies were conducted regarding the air-to-air effectiveness of single-role air-to-air units and those units how had to train for multiple missions. The statistics support the notion that dedicated air-to-air units performed better in that role.<sup>11</sup> One of the reasons is both missions were much more difficult than they are today. Older unguided bombs required difficult employment which required a lot of training to maintain proficiency.

Air-to-ground employment involved low altitude navigation to a specific action point followed by various types of fly-up or pop profiles that were intended to place a fighter in an optimum delivery parameter. During this maneuver, the pilot had only a few seconds to visually acquire the specific aim point and make any final required adjustments.

Precision was solely a result of the pilot's ability to fly to specific parameters. These profiles are not constant and changed depending on desired dive angles, weapons effects, target characteristics, threat, and flight formation. In order to maintain any kind of proficiency, numerous training sorties are required. Diverting limited training sorties to an equally demanding air-to-air role naturally had a negative impact on air-to-ground proficiency.

However, several advances in near-real-time intelligence, coupled with very accurate Global Positioning System (GPS) equipment, have made PGM employment much more accurate and simple, particularly at medium altitudes. As new GPS guided systems are brought into this country's arsenal, it will become even easier to employ bombs with great precision. Even in single-seat fighters, such as the F-117 and F-16 require little initial and continuation training to remain proficient in employing various PGMs<sup>12</sup>.

The same is of course true with regard to air-to-air proficiency. In order to maintain fully qualified in air-to-air employment, pilots must maintain proficiency in dog fighting skills, element employment, radar intercepts, and weapons employment.

Advances in launch-leave missile technology, technologies contributing to increased pilot situational awareness, and data sharing advancements make the task of air-to-air employment much more user friendly and efficient than it was in the past.

While advancements in both of these arenas have made employment easier and more effective, it would be wrong to over simplify the tasks and attempt to argue against the logic that specialization equates to better proficiency. However, now more than ever, an F-15C pilot can realistically become familiarized in expanding roles, providing value added options once a commander has achieved air superiority.

Clearly, the best course of action is to allow pilots to master fewer tasks in a specialized approach. However, technological advances and the changing world may provide opportunities to rethink the specialized path we started down. Multi-role is needed now more than ever and precision employment is a must.

### **F-15C Contribution over Bosnia**

Perhaps the most clear example of this can be seen in the air operations over Bosnia Herzegovina. The indiscriminate use of destructive airpower by Bosnian Serbs caused an international cry for someone to stop the senseless killing. As a result, NATO forces were sent to the region to enforce the United Nations mandated No-Fly Zone. F-15Cs from Bitburg AB, Germany were dispatched to the region to conduct this enforcement in April 1993.

The F-15C was the obvious choice, given its radar capability. As time passed, it became obvious that there were not going to be any significant challenges against this respected fighter. The only real threat to air superiority could be made by a few Serbian MiG-29s, east of Bosnia. The Bosnian Serbs possessed only a few small attack aircraft with little to no air-to-air capability. Since the deployed F-15C squadron was in the process of moving from Bitburg to its new home in Spangdahlem, Headquarters United States Air Forces Europe (HQ USAFE) decided to temporarily replace the F-15Cs with F-16s from Ramstein. It was believed that the F-16 with the AMRAAM could defeat any threat in the region.

However, the situation on the ground in Bosnia began to change for the worse and it soon became apparent that air-to-ground forces might be needed to support United Nations Protection Forces (UNPROFOR) with selected air strikes.

The deployed F-16s began carrying two MK-82 bombs during the no-fly zone enforcement mission. This gave the air component commander, increased flexibility and responsiveness.

Over time the situation deteriorated to the point that additional forces were needed in the Area of Operation (AOR). Because of basing limitations, multi-role fighters deployed to Italy providing a great amount of flexibility for the combat planners.

As a result of the vast media coverage and the proven successes of PGM employment in Desert Storm, it became increasingly obvious that primarily PGM employers would be called on if needed. By this time the American public was interested in keeping casualties to a bare minimum while limiting collateral damage.

Since there was no real air-to-air threat, air superiority was basically achieved. The only real threat to free use of the skies came from SAMs and very little AAA. This reality became obvious over time as a few allied aircraft became victims of this threat. Consequently, this final challenge to air supremacy was averted by threat avoidance and use of SEAD assets. This gave us freedom to operate over most of the country.

This freedom of the skies and political pressure for precision employment caused planners to develop a medium altitude air campaign that ensured continued freedom and PGM employment.

The name of the game was PGM employment. USAF Col Wald, in a briefing to allied participants at NATO's 5th Allied Tactical Air Force in the fall of 1994, said if anyone

wanted to participate in the next strike, they would have to be able to bring PGMs to the fight. All others would watch.

The two new Block 40 F-16C squadrons at Aviano accelerated their planned LANTIRN conversion. In addition, they began an intensive spin up as Airborne Forward Air Controllers (AFAC).

Marine F/A-18s also brought multi-role. They possessed AFAC, LGB, SEAD, and air-to-air CAP capabilities. Spanish F-18s brought similar multi-role capability. F-15Es from Lakenheath were deployed for their multi-role capability. Block 50 F-16Cs brought SEAD and OCA capability. *F-15Cs were never invited back.* The bases in Italy filled to capacity with fighters who could bring more options to the fight. Since air superiority could be maintained with multi-role fighters, the air-to-air only fighter had to sit and watch.

Lt Gen Ryan, the Joint Forces Air Component Commander (JFACC) envisioned a battlefield that required a multi-role force. Following the PGM intensive Operation Deliberate Force, his multi-role F-16s saw action in the new AFAC role.

In response to a mortar attack near UNPROFOR peacekeepers, F-16Cs from the 510th FS scrambled from Aviano to northern Bosnia. AFAC F-16s located the target and confirmed it with UNPROFOR ground FACs using smoke rockets. After delivering his own bombs on the target, the AFAC passed target coordinates to several holding CAS F-16s. The AFAC then assumed laser responsibilities and guided five separate LGB buddy-lase attacks from the CAS fighters.

All the CAS F-16s had to do was fly directly to the target at 20,000ft. and allow the onboard system, similar to the previously described F-15C Auto function, to release the

weapon. The AFAC F-16 did all the work by guiding the bomb to the desired impact point. Any fighter capable of dropping an LGB could have flown straight and level at .9 mach and dropped a bomb on coordinates, even the F-15C.

### Notes

<sup>1</sup> Department of Defense, *Conduct of the Persian Gulf War: Final Report to Congress* (Washington, D.C.: Office of the Secretary of Defense, Apr 1992), 127, 129.

<sup>2</sup> Kinzey, 154.

<sup>3</sup> Dr. Eliot Cohen, *Gulf War Air Power Survey, Vol. II*, (Washington D.C.: Government Printing Office, 1993), 156.

<sup>4</sup> Thomas A. Keaney and Eliot A. Cohen, *Gulf War Air Power Survey, Summary Report*, (Washington D.C.: Government Printing Office, 1993), 184.

<sup>5</sup> Author's personal experience. I was the HVAA four-ship flight lead. I received this tasking after returning from an eight hour HVAA CAP mission. I had only enough time to go direct to the border but did not have enough gas to patrol the entire strike period. If I went to go to the tanker, I would have missed the entire strike. Having spent numerous hours dogging F-15Cs in the same piece of sky, I coordinated with AWACS to have another HVAA four-ship, already on station, protect the strikers. This remained a significant traffic deconfliction problem.

<sup>6</sup> Keaney and Cohen, 227.

<sup>7</sup> Ibid. 17, 18.

<sup>8</sup> Lt Col Mead and Lt Col Nacke, "Tiger Tracks to Iraq," An unpublished squadron history of the 53 TFS accomplishments during Desert Storm, 1991, 18. This squadron history tells how Lt Gen Horner praised the 53 TFS for their accomplishments and made an off-hand comment of using the F-15Cs to drop bombs.

<sup>9</sup> Author's personal experience. My search for documentation of this effort has not produced a little evidence that this was a plan generated by the JFACC. I personally engaged in heated discussion with the wing leadership regarding this attempt. I was deeply concerned with the total lack of training and experience in this new role. I felt it was inappropriate to subject our pilots to this untested, unpracticed role. As a result of my medium altitude LGB experience since then, I am confident that we could have easily accomplished this mission had we had chance to prepare before the war.

<sup>10</sup> Keaney and Cohen, 197.

<sup>11</sup> Ford, 73-76.

<sup>12</sup> Author's personal experience. I was tasked, as a new F-16 squadron commander, to stand up a new medium altitude PGM capability using the targeting pod of the LANTIRN system at medium altitude.

## Chapter 4

### Expanding Missions, Remaining Relevant

*To be prepared for war is one of the most effectual means of preserving peace.*

—General George Washington

*War should be the only study of a Prince. He should consider peace only as a breathing time, which gives him leisure to contrive, and furnish ability to execute.*

—Niccolo Machiavelli

Many believe future combat operations will continue to demand the use of precision weapons. It is likely that many operations will be conducted from medium altitude once air supremacy has been achieved. As a result, many non-PGM units are making changes to their tactics and equipment that will make them more attractive for use in combat.

### Air National Guard

The US Air National Guard (ANG) F-16 community has come to grips with criticality of being able to bring PGMs to the fight. They understand the requirements of the future and are looking for ways to fill any void in order to remain relevant in the face of reduced force structure.



For example, New Mexico's 150th Fighter Wing is taking the lead in the ANG by assuming an AFAC/PGM role similar to their active duty counterparts in the 36th Fighter Wing at Aviano.

Their concept of operations is to employ a PGM version of the Vietnam Killer-Scout tactic. In Vietnam, AFAC fighters (Scouts) flew around looking for potential targets. When they were found, the AFAC marked the target with smoke rockets and directed accompanying fighters (Killers) to drop their bombs on it.<sup>1</sup> By using this similar tactic, the ANG is providing force enhancement and relevancy to other non-PGM capable fighters.

They have conducted extensive training with other units, such as the Block 30 F-16, non-LANTIRN capable Colorado ANG. The New Mexico ANG's Block 40, LANTIRN equipped F-16s act as target finders.<sup>2</sup> With their targeting pod they obtain GPS target coordinates and pass the information to the any non-PGM capable bomb dropper. By cycling AFAC hunters on and off an air refueler, they are able to provide a continuous presence over the fight. Non-lasing fighters come to the fight with LGBs in a kind of feed the fight role. The non-PGM capable air craft simply check-in with the AFAC, receive target coordinates, and deliver an LGB from medium altitude. The AFAC does the rest.

The Virginia F-16 ANG has equipped their aircraft with a reconnaissance pod that is filling a current void made by the retirement of the RF-4. In doing so they have found their niche in the next conflict to provide the JFACC additional options. Their maiden deployment to Bosnia proved valuable to that conflict in the CAS, CAP, and Reconnaissance role.

## **Multi-Role F-14 Tomcat**

Perhaps the most striking example of how a unit is tailoring its force structure to contribute more to the fight is seen in the US Navy.

The Navy F-14 story is similar to the USAF F-15 story in almost every respect. Although a predecessor to the F-15, the F-14 was designed specifically as an air-to-air fighter. Fleet defense has been its primary mission until recently.

In light of anticipated force structure cuts, the Navy has taken a serious look at how it can posture its air arm to remain viable in the near future. One of the most significant changes made in the Navy fighter force was the recent acquisition of a new modified targeting pod for the F-14.

Lockheed Martin was awarded a \$3.5 million dollar contract as a part of Navy's F-14 Precision Strike Program.<sup>3</sup> This contract included development of a new targeting pod that differs from current targeting pods in use by the USAF. The contract also includes F-14 cockpit interface and aircraft wiring modifications.

The pod differs from the USAF pod in that it has a self contained Inertial Measuring Unit (IMU) and GPS system. The new targeting pod is in reality a self contained weapon system requiring very little data transfer from the F-14 internal system.<sup>4</sup> The engineers designed the pod's internal computer to calculate all of the ballistics data for various weapons. By doing this, the resident software in the F-14's AWG-15 weapons control system did not have to be changed, saving enormous amounts of dollars

By using a streamlined acquisition method, the Navy has fielded the system barely 19 months after Lockheed suggested it to the Navy. Lockheed Martin accomplished this by underwriting the demonstration phase. Now the F-14 Tomcats are true multimission

fighters. The F-14 can now escort others to the target, drop bombs themselves, provide any reconnaissance feed back, and perform as a buddy-lasing AFAC missions, if needed.

The Navy has given new life and much needed PGM capability to the F-14 that will enhance its contribution for years to come. Navy Capt Jim Zortman, Commander, Carrier Air Wing 17, summed up the need for multimission in an interview with Aviation Week and Space Technology.<sup>5</sup>

There's not an aircraft sitting on a carrier deck today that's not doing something different than it did five years ago....Everything is multimission now. Everywhere we go, the first question a CINC asks is, 'how many aircraft are available that can deliver precision-guided munitions?' Now, in addition to performing their [traditional] escort mission, the F-14s can put a credible weapon in the right place. Everybody going to the target is hauling bombs

The navy plans to purchase 90 targeting pods and is currently modifying 212 F-14s.<sup>6</sup> The F-14s will be with the Navy for at least another fifteen years. Now it will give fighting commanders greater flexibility.

The future use of air power is anyone's guess. There does not appear to be a major threat on the horizon that is likely to plunge our forces in a large scale conflict. If recent trends are a taste of the future, we are more likely to face limited regional operations similar to the use of air power over Bosnia. In any case, our historical success and value in achieving air superiority will strongly influence how we plan future operations. We will no doubt conduct the operation in such an aggressive way as to achieve ownership of the skies early in the conflict. The F-15Cs will play a significant role in this effort until the F-22 replaces it.

Once air space dominance is achieved, the F-15C should be able to bring additional firepower to the scenario. Other single-role platforms have increased their value by

adding multiple roles. Delivery of newer weapons now provide greater accuracy with less employment effort. The Navy understands this. The USAF should take the Navy's lead and do something similar with the F-15C.

### Notes

<sup>1</sup> William Scott, "Revived Killer-Scout Tactics Leverage PGMs," *Aviation Week and Space Technology*, 21 October, 1996, 48.

<sup>2</sup> Ibid. 48-51.

<sup>3</sup> A Lockheed Martin Report, Untitled, Orlando, Florida, Sept 20, 1995, found at [www.lmco.com/lantirn/news.html](http://www.lmco.com/lantirn/news.html)

<sup>4</sup> William Scott, "Lantirn Gives Tomcat Night Attack Role," *Aviation Week and Space Technology*, 10 June, 1996, 40-43.

<sup>5</sup> Ibid. 42.

<sup>6</sup> William Scott, "Contractor Investment Key to F-14/Lantirn," *Aviation Week and Space Technology*, 10 June, 1996, 44.

## Chapter 5

### **Air-to-Ground Options for the F-15C**

*...to see what is right and not to do it is cowardice.*

—Confucius

This Chapter suggests possible air-to-ground employment options for the F-15C. It will not address technical modifications that may or may not be required, but will focus on potential employment concepts.

#### **Suppression of Enemy Air Defenses**

The F-15C should be given the capability to employ High speed Anti-Radiation Missile (HARM) weapons. The retirement of the F-4G brought a USAF shortfall in this important OCA mission. As we found in Desert Storm and in Bosnia, enemy SAMs became more of a threat to airspace dominance than any fighter activity. Their suppression, from a planning standpoint became essential. Nearly every strike package included some kind of soft kill or hard kill capability against SAMs.

Today, the USAF has given this role to Block 50 F-16 units. In the later years of General McPeak's tenure as Chief of Staff, this role was envisioned for the F-15C. It seemed like a perfect match. Since the F-15C protects strike packages from enemy threats, giving it a SEAD capability only enhances this protection capability. From a

striker view point it doesn't matter where a threat comes from. A missile threat is a missile threat, and their suppression is key to the strike package success.

This new capability seemed forthcoming. The only real question that needed addressed was whether or not the SEAD mission could be effectively employed from a single place cockpit. This question has largely been answered favorably since the new single-seat Block 50 F-16s were modified for this role.

The SEAD requirement over Bosnia uncovered a shortfall in USAF SEAD. Since the retirement of the F-4G fleet, there is a growing reliance on the Navy to perform this mission. The Air Force is now looking at employing the EA6-B to fill this gap.

Another option is to equip F-15Cs with this capability. It has longer endurance and range than the F-16, which could prove to be a limitation in the future. While the EA-6B has a respectable range, it does not have the speed to keep up with the package, nor does it have any ability to shoot down enemy air. In deep situations, a HARM shooting F-15C certainly add protective power to its force protection mission.

From a training and deployment standpoint, the USAF could give this additional capability to selected units who are co-located with or near other SEAD assets. For example, the 53 FS (F-15C squadron), located at Spangdahlem AB, Germany could be given this mission as an augmentation to the two resident SEAD F-16 squadrons.

It is possible that these two fighters could develop tactics that would compliment their combined use as they did when the SEAD squadron employed F-4Gs and F-16s together. This wing could provide a composite capability that would provide significant force protection capability in a battle space against an enemy that employed SAMs, air defenders, or both.

## **Medium Altitude PGM Employment**

As a minimum, F-15C pilots should be trained, and maintain a basic familiarization of level medium altitude bomb employment. Operating in conjunction with a laser spotting capable asset, the F-15C could bring a significant load of LGBs to the battle field.

Depending on the scenario, the F-15C could be tasked to initially sweep ahead of a strike package. By replacing either the centerline tank or the wing external tanks with LGBs, an F-15 could sweep ahead or escort the packages, establish a protective CAP and follow with a lethal blow over the target area on the way out. By using either ground lasing assets or buddy-lasing fighters, the F-15C pilot could very accurately drop an LGB, from a level delivery profile, into the required guidance window for final tracking by a laser.

In a CAS environment, targeting pod equipped AFACs could cycle on and off the target area to refuel while F-15Cs surge with weapons. A nearly continuous flow of buddy lased bombs could be generated in a kind of “feed the fight” environment. Similar use of LGB carrying B-1 bombers is being developed. This can certainly be done with F-15Cs.

Units co-located with or near other LANTIRN assets could be tasked to train and equip themselves for this additional mission. For example, the F-15C squadron at RAF Lakenheath could be tasked to develop this capability with the two F-15E LANTIRN squadrons. Achieving at least a familiarization status would require minimal spin up during a conflict once air superiority is achieved.

## **LANTIRN Targeting Pod Employment**

Equipping the F-15C to carry and employ the LANTIRN targeting pod is much more costly and training intensive than the previous LGB option, but offers significantly more potential. Not only will this approach give the F-15C pilot the ability to acquire, track and lase his own bombs, it would offer significant air-to-air potential as well.

One of the huge benefits of the targeting pod provides is an ability to see airborne targets at great range. A targeting pod can see targets as far as eighty miles depending on the background clutter. At ranges in excess of forty miles, it is possible to tell if the target is a large transport or a small fighter. Pilots can also easily see the target's formation size and composition at these ranges. It is very easy to see formation maneuvers and splits as well. Deceptive split maneuvers can be detected using the targeting pod long before it becomes apparent on radar.

Another significant air-to-air aspect of the targeting pod is its identification capability. Positive identification of fighter sized targets is possible inside seven to ten miles, at any aspect angle, day or night.

The pod is also quite useful as a situational awareness enhancer. During tanker rejoins, for example, it is possible to see if there are fighters on the wing or boom of the tanker. This function is particularly useful at night during minimum communications tanker operations.

One final benefit the targeting pod can provide for air-to-air employment is bandit tracking during defensive maneuvers. Because of the liberal gimbal limits of the pod's seeker head, a pilot can lock on a target with the pod and turn ninety degrees in a radar missile defensive move and still monitor the target. The defending F-15 pilot can easily



see if the enemy aircraft launches a missile. LGB employment could also be accomplished as described above but without the requirement of a buddy lasing asset.

The targeting pod could also be used to provide target Battle Damage Assessment (BDA) in the area. Depending on the threat, F-15C pilots could take video pictures of tasked areas using the targeting pod.

Some modifications of the F-15C would be required in order to employ the pod. There are enough similarities to the F-15E aircraft that the modification would not require breaking too much uncharted ground. We could either modify the F-15C to carry the current USAF targeting pod or take the Navy approach and use a modified pod than can be easily adapted to the F-15C. Regardless of the method, this addition would greatly enhance the F-15C in either role.

## **Future Munitions**

The future of air-to-ground weapons development are yielding technologies that are making air-to-ground employment much easier. Weapons such as the Joint Direct Attack Munitions (JDAM) or GPS aided weapons will be able to guide themselves to the target using self contained guidance capabilities.

With these new weapons it may even be possible to employ them from a very liberal release parameter. The F-22, for example, is expected to be able to carry the JDAM and will be able to release the weapon from an extremely liberal launch parameter.

There is growing debate and pressures from various research groups that support the delay of the F-22 production. With an expected shelf life well into the 2020s, the F-15C

may well be required to perform longer in the face of budget restraints, while some pressure the USAF to delay production of the F-22.

In the meantime, we should carefully examine the possibility of employing these new revolutionary weapons from anything that can carry them. F-15Cs, carrying JDAMs could provide a serious threat to the enemy while either enroute to a CAP location or performing a dedicated strike role.

This chapter described a few possible air-to-ground employment options for the F-15C. They vary in complexity from the simple level release of a weapon to the more complex employment of weapon systems. In any case, future possibilities exist beyond what may be mentioned here. As future weapons become more accurate and easier to employ, we must not close the door on the possibility of using a tremendous asset, the F-15C.

## Chapter 6

### Conclusion

*I don't know much about history, and I wouldn't give a nickel for all the history in the world. History is more or less bunk. It is tradition. We want to live in the present, and the only history that is worth a tinker's damn is the history we make today.*

—Henry Ford

As prudent and effective military leaders, we must be careful not to live too much in the past. While it might be vitally important to understand the path we have traveled to get to where we are today, we must not let that journey dictate the present nor cloud our vision of the future.

With regard to the F-15C, it is important to fully appreciate how and why we built it. But over time, when the “why” changes, it may be prudent to step back and examine the new picture in its new context.

We built a fighter that would be able to defeat a major attack from a growing Soviet fighter threat. The creation of this fighter produced not only a superior air-to-air platform, it also yielded an air-to-ground capability that presents incredible promise.

However, because of the light our history shed on the new future Soviet threat, we embarked on a course of specialization that made air-to-air the exclusive mission of the F-15C. Its air-to-ground capabilities became the source of life for a new air-to-ground fighter.

When the future became the present, the world changed. While the Soviet Union collapsed, we found ourselves engaged in conflicts that were unthinkable just a few years previous. In our preparation for the Soviet super-power, we believed air superiority was critical to success. We also believed it would take a full effort of single-role specialists to achieve it. The unforeseen conflicts that came our way produced unimaginable air superiority successes. As a result, airspace dominance, was achieved quickly, leaving our F-15Cs little more to do than patrol the skies.

In the Gulf War, our adversary chose to avoid losing any more fighters in aerial combat by hiding his assets. In Bosnia, the warring factions possessed virtually no air-to-air threat of any kind. As a result, F-15C pilots found little to do other than bore holes through the sky, always ready to take on a threat that either was defeated or didn't exist.

Some may wonder if the F-15C is an albatross or bird of prey? I submit that it is one of the most effective and lethal birds of prey in existence. The F-15C remains the most respected air-to-air threat in the world. The true razor sharpness of its multi-mission talons have yet to be fully realized. If our nation ever goes to war against an adversary who possesses any semblance of an air-to-air threat, the F-15C should be on the first team to deploy.

But when the skies are free from enemy air, the un-tapped lethal air-to-ground capabilities of the F-15C should be unleashed as a part of our violent projection of flexible air power.

## ***Bibliography***

- Angelucci, Enzo. *The Rand McNally Encyclopedia of Military Aircraft, 1914-1980*. New York: The Military Press, 1983.
- Center for Air Force History. *Sharpening the Eagle's Talons: USAF and the Desert Shield Second-Phase Deployment November 9, 1990-January 17, 1991*. Washington, D.C.: 1993.
- Christie, Thomas P., Gary C. Comfort, and Richard E. Guild. *Desert Shield/Desert Storm Air-to-Air Performance Study*. Alexandria, Virginia, April 1992.
- Church, Maj Jimmy H., Maj Robert T Osterthaller. "The Battle for Air Superiority During the 1973 Arab-Israeli War." Research Report. Quantico, VA.: 1983.
- Cohen, Dr. Eliot A. *Gulf War Air Power Survey, Vol. 2*. Washington, D.C.: Government Printing Office, 1993.
- Covalt, Craig. "NATO Air Power to Enforce Peace." *Aviation Week and Space Technology*, 4 December 1995, 20-21.
- Crane, LCDR. Stephen H. "Measure of Effectiveness for the F-14A in the Maritime Air Superiority Mission Against the Soviet Cruise Missile Threat." Research Report. Maxwell AFB, Ala.: May 1978.
- Day, Maj John W. "Air Supremacy and Airland Operations." Research Report. Ft. Leavenworth, KS.: U.S. Army Command and General Staff College, 1992.
- Department of Defense (DOD). *Conduct of the Persian Gulf War: Final Report to Congress*. Washington, D.C.: Office of the Secretary of Defense, April 1992.
- Dickey, Colonel Roy S. "The Advocacy of the F-15," Research Report no. 4893. Maxwell AFB, Ala.: Air War College, April 1973.
- Dunnigan, James F., Austin Bay. *From Shield to Storm: High-Tech Weapons, Military Strategy, and Coalition Warfare in the Persian Gulf*. New York: W. Morrow, 1992.
- Emerson, Donald E. *Operation Desert Storm Master Attack Plan*. Santa Monica, California, November 1993.
- "F-15 Tested for SEAD Role." *Aviation Week and Space Technology*, 24 January 1994, 31.
- "F-22 Mission Reflected in Weapons Mix." *Aviation Week and Space Technology*, 24 July 1995, 42-43.
- Ford, Maj Michael W. "Air-to-Air Combat Effectiveness of Single-Role and Multi-Role Fighter Forces." Research Report. Ft. Leavenworth, KS.: U.S. Army Command and General Staff College, 1994.
- Fulghum, David A. "ACC Weighs Plans for New Technology." *Aviation Week and Space Technology*, 29 April 1996, 38-40.
- Fulghum, David A. "Big F-22 Budget Drives Search for Flaws." *Aviation Week and Space Technology*, 10 April 1995, 21-22.

- Fulghum, David A. "Wild Weasels May Get Optic-Blinding Laser." *Aviation Week and Space Technology*, 8 March 1993, 25-26.
- Fulghum, David A. "RAND Study Outlines Two-War Strategy." *Aviation Week and Space Technology*
- Hallion, Richard. *Storm over Iraq: Air Power and the Gulf War*. Smithsonian Institution Press, 1992.
- Herlik, Ed. *An Oral History by Desert Storm Fliers and Their Families*. Blue Ridge Summit, PA.: Tab Aero, 1994.
- Hicks, LCDR Gary B. "Joint Suppression of Enemy Air Defenses During 'Desert Storm': Implications for the Future Campaign Support J-SEAD Operations." Newport, R.I.: 13 November 1992.
- "Improved AGM-88C Enhances HARM Anti-Radar Capabilities." *Aviation Week and Space Technology*, 12 July 1993, 57.
- Kacena, Maj Neal G. "Instructional Text, Computed Weapons Delivery Course F1500IDOPN F-15," Research Report no. 87-1395. Maxwell AFB, Ala.: Air Command and Staff College, 1987.
- Kandebo, Stanley, David Hughes. "F-22 to Counter 21st Century Threats." *Aviation Week and Technology*, 24 July 1995, 38-42.
- Keaney, Thomas A., and Eliot A. Cohen. *Gulf War Air Power Survey, Summary Report*. Washington, D.C., Government Printing Office, 1993.
- Kern, Maj Anthony T. "A Historical Analysis of U.S. Air Force Tactical Aircrew Error in Operation Desert Shield/Storm." Research Report. Ft. Leavenworth, KS.: U.S. Army Command and General Staff College, 1995.
- Kinzey, Bert. *F-15 Eagle in Detail & Scale*. Fallbrook, CA.: Aero Publishers, Inc., 1984.
- Kinzey, Bert. *The Fury of Desert Storm: The Air Campaign*. Blue Ridge Summit, Pa.: Tab Books, 1995.
- Kinzey, Bert. *U.S. Aircraft & armament of Operation Desert Storm in Detail & Scale*. Waukesha, WI.: Kalmbach Books, 1993.
- Klass, Philip J. "F-15C to Test for Wild Weasel Mission." *Aviation Week and Technology*, 13 June 1994, 27.
- Lambeth, Benjamin S. *The Winning of Air Supremacy in Operation Desert Storm*. Santa Monica, California, 1993.
- "LANTIRN-Equipped F-15Es Pose Strong Deterrence to Iraqi Threat." *Aviation Week and Space Technology*, 12 November 1990, 54-55.
- Lockheed Martin Report. "Untitled." Orlando, FL.: On-line. Internet, 20 September 1996. Available from <http://www.lmco.com/lantirn/news.html>.
- McDonnell Douglas. "Maximizing U.S. Air Force Tactical Aircraft Mission Effectiveness." A Multimission TACAIR 2000 Roadmap Study. St. Louis, Mo., September 1992.
- McDonnell Douglas. *F-15 Armament Handbook*. Product Service Publication. St. Louis, Mo., 1979.
- Meilinger, Col Phillip S. *10 Propositions Regarding Air Power*. Air Force History and Museums Program. Maxwell AFB. Ala.: School of Advanced Airpower Studies, 1995.

- Metz , Maj Michael, "A Proposed Day/Night Surface Attack Continuation Training Sortie Ratio for F-15E Aircrews," Research Report no. 85-1855. Maxwell AFB, Ala.: Air Command and Staff College, 1985.
- Petersen, Maj David E. "The No-Fly Zones in Iraq: Air Occupation." Research Report. Fort Leavenworth, KS.: U.S. Army Command and Staff College, 1996.
- Powers, Capt Brian E. "Tactical Air Defense in Central Europe." Research Report. Monterey, CA.: Naval Postgraduate School, June 1984.
- Reynolds, Richard T. *Heart of the Storm: The Genesis of the Air Campaign Against Iraq*. Maxwell AFB, Ala.: Air University Press, 1995.
- Ripley, Tim. *Air War Bosnia: UN and NATO Airpower*. Osceola, WI.: Motorbooks International, 1996.
- Scott, William B. "Contractor Investment Key to F-14/LANTIRN." *Aviation Week and Space Technology*, 10 June 1996, 44.
- Scott, William B. "Electro-Optic Targeting Tools Bolster Bombing Accuracy of Allied Aircraft." *Aviation Week and Space Technology*, 28 January 1991, 25.
- Scott, William B. "Flight Underscores Demands of Killer-Scout Mission." *Aviation Week and Space Technology*, 21 October 1996, 50-52.
- Scott, William B. "LANTIRN Gives Tomcat Night Attack Role." *Aviation Week and Space Technology*, 10 June 1996, 40-43.
- Scott, William B. "Revived Killer-Scout Tactics Leverage PGMs." *Aviation Week and Space Technology*, 21 October 1996, 48-51.
- Smallwood, William L. *Flying the F-15E in the Gulf War*. Washington, D.C.: Brassey's, 1994.
- Smith, Maj Stanton T. III. "F-15 Surface Attack Systems," Research Report no. 85-2530. Maxwell AFB, Ala.: Air University, 1985.
- Thomas, Maj George E. "Air Superiority-Vietnam, Today, the Future." Research Report. Maxwell AFB. AL.: Air Command and Staff College, April 1987.
- Tirpak, John A. "Who Needs the F-22?" *Air Force Magazine*, April 1995, 24-29.
- Tomczak, Robert J. "The Emancipation of Air Power." Research Report. Carlisle Barracks, PA.: U.S .Army War College, 1992.
- Towell, Pat. "Conflict Looms Over B-2 and F-22 As Bill Heads to House Floor." *CQ*, 29 July 1995, 2292-2294.
- United States. Air Force. *Air Force Executive Guidance: January 1996 Update*. Washington D.C.: Air Force Strategy Division, 1996.
- United States. Air Force. *Dual Role Fighter Study, Methodology Annex*. Washington, D.C.: Assitant Chief of Studies and Analysis, July 1984.
- United States. Air Force. *Gulf War Air Power Survey; Summary*. 29 March 1993.
- United States. Air Force. Tactical Training Wing, 405th. *F-15 MSIP Training Manual: Multi-Stage Improvement Program*. Luke AFB, AZ.: March 1986.
- United States. General Accounting Office. *Program Evaluation and Methodology Operation Desert Storm: Evaluation of the Air War (U)*. Washington, D.C.: Distributed by Def.
- United States. General Accounting Office. *Tactical Aircraft F-15 Replacement is Premature as Currently Planned: Report to the Chairman, Legislation and National*

*Security Subcommittee, Committee on Government Operations, House of Representatives.* GAO/NSIAD-94-118, March 1994.

United States. General Accounting Office. *Tactical Aircraft F-15 Replacement Issues: Testimony before the Coalition Defense and Reinforcing Forces Subcommittee, Committee on Armed Services, United States Senate.* GAO/T-NSIAD-94-176, 1994.

Walker, Bryce, et al. *The Epic of Flight: Fighting Jets.* Alexandria, VA.: TIME-LIFE Books, 1983.



DISTRIBUTION A:

Approved for public release; distribution is unlimited.

Air War College  
Maxwell AFB, Al 36112